Full ADHD health literacy game: Identification with the game's main character*

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Abstract

This study examined how 12 students (eight were females) participating in a special education course experienced the Full ADHD game. The game aims to provide insights into the lived experiences of individuals with ADHD. Full ADHD is a story-driven game that engages the player in the life of the game's main character, who has recently been diagnosed with ADHD. Playing the game takes about 70 minutes. We examined how identification with the game's main character manifested in students' experiences and what factors may have supported or hindered students' identification. Data was collected through a semi-structured interview that lasted from 28 to 59 minutes. We employed theory-driven content analysis and inductive procedures to reflect the data. The analysis revealed all three components of character identification: cognitive (adopting character's perspective), motivational (adopting characters goals), and emotional (adopting character's emotions). Additionally, some students engaged in self-oriented playing or reported detachment. We found several factors that may have supported (e.g., experiencing the similarity) or hindered (e.g., mismatches with the character) the identification with the main character. Some students identified more strongly with the main character than others, and the intensity of identification varied during the playing experience. Story-driven games may have potential to increase understanding of lived experiences of individuals with ADHD.

Keywords

identification, perspective-taking, digital games, game-based learning, ADHD

1. Introduction

Digital games can effectively promote health literacy, as shown in a meta-synthesis by Efe and Topsakal [1]. However, they also highlighted the scarcity of research on digital games in health education. Furthermore, only three of the analyzed studies focused on mental health issues, and none specifically addressed neurodivergence.

Although several digital health interventions, including games, have been developed for adolescent with ADHD [2], to our knowledge, no studies have examined games specifically designed to enhance understanding of the lived experiences of individuals with ADHD. However, Gerling et al. [3] recently explored lived experiences of adolescents with ADHD and their opinions on integrating representations of ADHD into games. As a result, they formulated design recommendations and highlighted importance of game designers being attentive to the unique challenges of representing disability, striving to avoid stereotypical or potentially harmful depictions.

Careful attention to the representation of neurodivergence not only ensures inclusivity but also has the potential to facilitate perspective-taking, thereby deepening players' understanding of the lived experiences of individuals with ADHD. Perspective-taking refers to spontaneous attempt to adopt the perspectives of others and see things from their point of view [4]. It is a core aspect of identification with media characters [5].

Cohen [5, p. 248] explains that identification is "an imaginative experience in which a person surrenders consciousness of his or her own identity and experiences the world through someone

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else's point of view." Although Cohen [5] originally conceptualized identification in relation to television, movie, and sports characters, this concept has been applied in game research as well. Games are often designed to immerse players in new roles within imagined worlds, fostering perspective taking and identification with game characters [6–9].

In this paper, we explore game character identification in the Full ADHD health literacy game, which is designed to provide insights into the lived experiences of individuals with ADHD, through a study conducted among students participating a special education course. To better understand players' experiences, we also explore the factors that may have supported or hindered game character identification.

2. Theoretical background

2.1. Characteristics of ADHD

ADHD is a neurodevelopmental condition characterized by differences in attention and/or activity level [10]. Because individuals with ADHD are often driven by diverse interests, they may shift their focus quickly [11]. This can lead to difficulty in maintaining focus and forgetfulness [10]. The inattentiveness may be perceived as carelessness by others [10]. On the other hand, individuals with ADHD can experience hyperfocus, which means a capacity to fully immerse in an interesting task while ignoring everything else [12, 13]. Successful adults with ADHD, interviewed in the study by Sedgwick et al. [13], connected hyperfocus to their productivity.

Furthermore, individuals with ADHD can exhibit high energy levels, which is often manifested through hyperactivity and impulsivity and further associated with a tendency to act without considering the consequences [10]. Because of their vigor, individuals with ADHD actively seek out novelty, which can nurture divergent thinking and the ability to think out of the box [12, 13].

Individuals with ADHD are likely to experience difficulties in executive functioning [14, 15]. Executive functions include inhibitory control, working memory, and cognitive flexibility [16, 17]. Inhibitory control refers to the ability to control one's attention, behavior, thoughts, and emotions, which allows an individual to resist temptations and maintain selective attention [17, 18]. In turn, working memory allows individuals to maintain and manipulate information over a short period of time while engaging in other cognitive activities [19]. Finally, cognitive flexibility involves the ability to shift attention and change perspectives or ways of thinking about an issue [17, 19].

Executive functions enable individuals to plan actions, prioritize, and sequence behavior, resist distractions, use information to make decisions, and achieve goals [16, 19]. Difficulties in executive functioning can lead to challenges at school, in studies, and everyday life. Consequently, Brown [15] argues that these challenges are best observed in how individuals perform over time in various everyday tasks where they must manage themselves. Therefore, the digital game that allows players to immerse themselves in various everyday events faced by the main character with ADHD can offer valuable opportunities for perspective-taking.

2.2. Identification with media characters

Our study is grounded in character identification theory, which posits that identifying with characters enhances engagement, facilitates understanding of stories, and contributes to changes in self-perception and attitudes [20]. According to Cohen [5], identification with media characters is an imaginative process that unfolds in response to characters described within texts. Identification can be considered as a cognitive and emotional state in which a person no longer sees him- or herself as an audience but instead imagines being one of the media characters.

Identification involves cognitive, emotional, and motivational components [20]. The cognitive component refers to adopting the characters' perspective and understanding of how they interpret events. The emotional component refers to adopting the character's emotions. For example, the player tends to experience joy when something positive happens to the character and tends to feel sadness when the character is faced with tragedy. Finally, the motivational component refers to the

adoption of the character's goals. According to Green et al. [21], adopting a character's thoughts, goals, emotions, and behaviors is essential in the identification process, leading to the loss of self-awareness and enabling immersion in the fictional world.

2.3. Factors supporting identification

Cohen [20] has emphasized that identification is not binary, but its intensity can vary. Consequently, some people may identify more strongly with a specific media character than others. Furthermore, the intensity of identification can fluctuate throughout the media experience. For example, if the game character does something with which the player does not wish to be associated, the intensity of identification can decrease.

Indeed, identification with media characters is a dynamic process that depends on several factors. According to Cohen [5], features of media characters and texts and characteristics of media audiences determine the level of identification. People tend to identify more strongly with characters portrayed positively and exhibit desired positive traits [20]. Meaningful similarity between the character and the audience member also supports identification [22]. On the other hand, the perspective from which the story is told can affect identification. In particular, a story that helps to imagine the situations from the character's perspective has been reported to support identification [20]. Aligned with this, vivid descriptions of the character's mental states and physical surroundings may help the audience to immerse in the story and increase identification [20].

2.4. Character identification in digital games

Klimmt et al. [8, p. 351] define video game identification "as a temporal shift of players' self-perception through adoption of valued properties of the game character." In contrast to non-interactive media, games allow players to engage actively within the game world rather than only observe the media environment. In principle, games simulate the circumstances of being a game character and perceive the game events from the perspective of that character.

The factors that support identification in non-interactive media also create the foundation for identification with the game characters. However, games include unique features that also can affect identification. For example, Cicchirillo [23] found that third-person perspectives supported identification mediated by motivational tasks in the game world. They interpreted that the third-person viewpoint lets the player see the character and its gestures. Such a visual presence seems to help the player to consider similarities between the game character and self. Furthermore, games often include character customization features that have been found to support identification with the game characters [24]. In addition, research has shown that the design of non-player characters may affect identification [25].

While research on game character identification has largely focused on entertainment games [23, 25, 26] studies are increasingly exploring character identification in the field of game-based learning as well. In general, the literature shows that games can influence players' attitudes toward specific groups of people through identification with game characters [7, 27, 28]. For instance, Bachen et al. [27] examined a simulation game that addressed the aftermath of the 2010 Haiti earthquake. They found that the immersive experience in the game predicted character identification and game-specific empathy toward the people affected by the disaster.

Moreover, a study by Ferchaud et al. [7] showed that identifying with the main character, who has a mental illness, changed players' views on mental health. The interactive gameplay facilitated game character identification, reduced the desire for social distance from people with mental illnesses, and fostered empathy. However, the identification with the game character may not necessarily be positively related to attitudes toward a targeted people group. For example, Chen et al. [28] examined character identification in the immigration-themed game *Papers, Please*. They found that identification with the player and non-player characters significantly predicted players' post-game attitudes toward immigrants. However, players' attitudes toward immigrants shifted in

a negative direction. Nevertheless, these results show that understanding character identification is essential also in the game-based learning field.

In this paper, we explore game character identification in the Full ADHD health literacy game, which is designed to provide insights into the lived experiences of individuals with ADHD, through a study conducted among students participating a special education course. To better understand players' experiences, we also explore the factors that may have supported or hindered game character identification.

3. Present study

In this study, we explored students' playing experiences in the Full ADHD health literacy game. The main character of the game is a young adult who has recently received an ADHD diagnosis. Building on previous research on character identification, we focused on students' manifestations of identification and related factors. The following research questions guided our exploration:

1. How was identification with the game's main character manifested in students' experiences?
2. What alternative responses to the game, diverging from character identification, did students describe?
3. What factors may have supported or hindered students' identification with the game's main character?

4. Methods

4.1. Methods

Participants were recruited from two courses which are part of the "Basics of special education" studies (25 ECT) offered by one open university in Finland. In addition, the opportunity to participate in the study was announced twice through a university's internal news channel to educational students. It was announced that if at least 60 students participated in a study, participants would be entered into a draw to win an iPad/AirPods. Participation included playing a Full ADHD game and filling in pre- and post-play questionnaires. Students filled in the informed consent form to participate in the study.

In total, 27 voluntary students participated in the study. In the post-play questionnaire, fourteen students indicated their willingness to be interviewed about their experiences playing the Full ADHD game. The participants of the present study were twelve students who were eventually interviewed. Participants (eight were females) were 20 to 47 of age. Of the participants, 92% reported knowing someone with an ADHD diagnosis. Additionally, 50% reported either having or suspecting they might have ADHD.

4.2. Description of the Full ADHD game

Full ADHD is a narrative-driven game in which the player plays the role of Eddie, a 20-year-old university student recently diagnosed with ADHD. Psyon Games has developed the game in collaboration with an ADHD association, an expert psychiatrist, and people with ADHD. The game avoids stigmatizing the representation of ADHD by grounding the design of the game characters, events, and narrative on the actual lived experiences of young adults with ADHD. The core symptoms of ADHD and related experiences are blended in the game. Therefore, it does not directly describe any of major sub-type of ADHD or any specific person. The game has been designed to enhance understanding of the impact of ADHD on daily life. Additionally, it provides information on diverse manifestations of ADHD, its effects on executive functions, the diagnostic process, and coping strategies, all embedded within the game narrative and mechanics. Overall, the game tells a story about Eddie's daily life. As the story progresses, the player makes choices that

guide Eddie's behavior and life. Playing the game, available in Google Play and Apple Store, takes about 70 minutes.

4.2.1. Game characters and locations

The main character, Eddie, has just got an ADHD diagnosis, started his university studies and a new job as a pizza deliveryman. Eddie's ADHD impacts on his daily life in several ways. Eddie has difficulties, for example, starting uninteresting activities, completing tasks, regulating emotions, controlling activities, and paying attention. He is sensitive to distractions and sometimes impulsive. His impulsivity is expressed through impatience, thrill-seeking, risky behavior, irritability, a short temper, and recklessness. Eddie does not exhibit static symptoms throughout the game events, but several factors affect his behavior. For example, he can experience issues with focus and attention in specific settings (e.g., in a noisy lecture room), or difficulties may be exacerbated in particular situations (e.g., when Eddie is tired and has already used a lot of executive function resources).

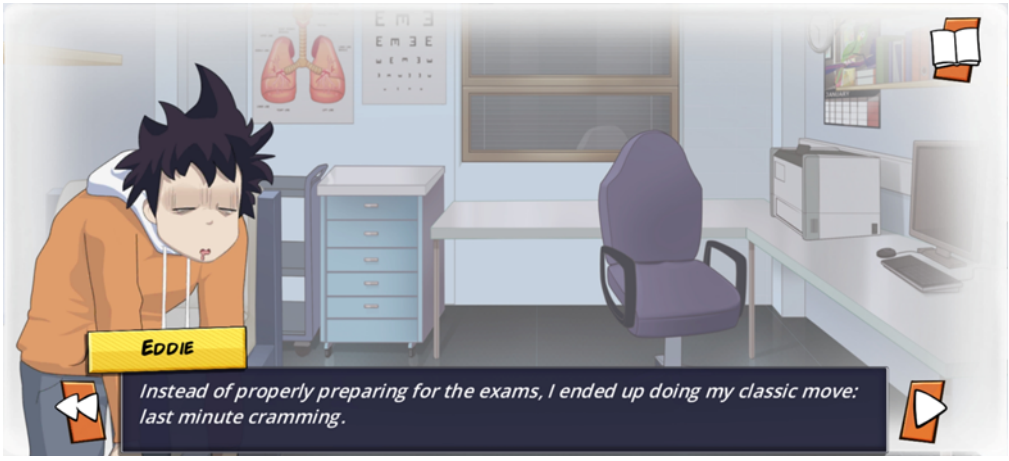

Figure 1: The player's game view in the Full ADHD game, showcasing an example of a game event that highlights Eddie's exaggerated gestures.

Figure 2: The player's game view in the Full ADHD game. Available executive function resources are on the top left (1 diamond), the unit price of each executive function cluster is shown beside the icons on the left, and response options to game situations and their prices are shown in the middle. If the player does not have enough resources, the response option is colored in red.

Aligned with [12, 13], Eddie's ADHD is also portrayed as an asset in the game, highlighting characteristics such as creativity, divergent thinking (the ability to generate novel or ingenious ideas), hyper-focus, resilience, and curiosity. These characteristics allow him to excel in specific activities.

The game's events unfold in environments where Eddie spends the majority of his time, including home, university, workplace, a café, and the city. The central characters Eddie interacts with throughout the game include his mother, friends, university lecturers, a nurse, a doctor, and his boss at the pizzeria. The game is played from a third-person perspective, which is shown to support identification [23]. The use of vivid descriptions and illustrations of Eddie's mental states aim to immerse players in the story and facilitate identification with him (see Figure 1).

4.2.2. Gameplay and game mechanics

The gameplay is divided into four levels. The gameplay primarily involves reading Eddie's story and making choices for him (Figure 2). The choice-based narrative is intrinsically integrated [29] with resource management mechanics, shedding light on how using and managing cognitive (executive function) resources affects Eddie's daily life.

Eddie has limited executive function resources (represented as diamonds) that are distinguished into six clusters (see Table 1). The executive function resource pool represents Eddie's overall ability to perform in a goal-directed way—different activities in the game strain specific resources. Figure 2 shows an example situation where a player has three response options. The icons in speech bubbles show which clusters are strained and how much each option requires resources. In this example, selecting the first option requires resources from the focus cluster (1 diamond), and the third option requires resources from focus (1 diamond) and action clusters (1 diamond).

Table 1

Activities Requiring Resources for Executive Functioning in the game

Activity themes	Required executive functions
Activation 	Taking actions, planning activities, and prioritizing things
Focus 	Directing, maintaining, and shifting attention
Effort 	Persistent effort, determined trying, working speed, regulation of alertness
Emotion 	Emotion regulation and managing frustration
Memory 	Working memory use and recalling
Action 	Monitoring actions and adapting to the situation

Note. Activities are based on the categorization of executive functioning by Brown [15].

The second option does not require resources, but such free options can make Eddie's life more difficult in the long run. Further, if the player exhausts all available resources, they are left with no choice but to select free options.

The price of the selected option is deducted from the resource pool (a total number of diamonds). The price increases by one each time the same cluster is strained at the same game level. Prices are decreased, or players can earn resources when choices are aligned with ADHD self-care methods such as sticking to a regular sleep schedule (e.g., not playing video games at night) and having regular mealtimes. Overall, the progression of game events ultimately depends on resource management and choices made by the player.

4.3. Data collection and procedure

Data was collected through a semi-structured interview consisting of open-ended questions on the following themes: 1) learning and experiences about the game, 2) identification with the game character, 3) playing strategies, and 4) the usefulness of the game. In particular, the second theme was supposed to prompt reflections relevant to our theoretical framework of identification with media characters, and the present study focuses on this theme.

The first author conducted the interviews via Microsoft Teams. At the beginning of the interview, the researcher informed the interviewees about their rights, handling of the data, and asked for verbal consent to record the interview. The interviewees were encouraged to ask questions if they had something in their mind. The researcher highlighted that all views and experiences are valuable, regardless of their nature. During the interviews, the researcher encouraged the interviewees through verbal and non-verbal communication (e.g., nodding). The recorded interviews, lasting 28 –59 minutes, were transcribed.

4.4. Data analysis

We employed a theory-driven content analysis [30, 31] to examine students' identification with the game's main character. The deductive procedures were guided by our research questions and the theoretical framework of identification with media characters [5, 8, 32]. We also employed inductive procedures to reflect the data. However, we interpreted these emerging categories through the character identification framework.

To ensure the rigor of the analysis, we conducted multiple analysis rounds. First, the first author wrote a memo with initial observations about the four interview themes.

Second, to reduce the data, she read the transcripts several times to identify fragments that included talk related to identification (including supporting and hindering factors) or alternative responses diverging from the identification. A fragment ended when the topic of the talk or the speaker (from student to interviewer) changed. The fragments (N = 64) were usually about two to three sentences long.

Third, all authors familiarized with the fragments to develop a coding scheme. The developed coding scheme was based on the character identification framework and insights gained during the familiarization process (Table 2). Fourth, authors coded part of the data together. They identified and coded expressions (the unit of analysis) within the fragments while discussing interpretations of the codes. This process resulted in the final coding scheme. Fourth, the second author coded the remaining data. For the note, each expression could have got more than one code. Next, the two other authors reviewed the coding. After that, all authors discussed and formed the sub-categories and further the main categories. Finally, the number of codes representing each sub-category was tallied.

Table 2
Coding Scheme and Codes

Codes	References
Adopting character's goals (+)	[20, 21]
Perspective taking (+)	[8, 20, 21]
Feeling with character (+)	[5, 20, 21]
Feeling empathy (+)	[5]
Psychological similarity (+)	[5, 22]
Demographic similarity (+)	[5, 22]
Making decisions for character (+)	[8]
Taking care of character (+)	
Playing through own perspective (-)	[8, 20]
Relating game events to self (-)	[5]
Feeling about main character (-)	[5]
Spectatorship (-)	[5]
Differences with character (-)	[5, 22]
Character is unacceptable (-)	[20]
Character is unlikeable (-)	[20, 22]
Negative perceptions of game (-)	
Negative perceptions of NPCs (-)	[25]

Note. The relationship with character identification is indicated using '+' and '–' symbols

5. Results

When examining expressions across all students, we found 27 expressions that indicated identification with the game's main character (Table 3). These were grouped into two main categories: Adoption of main character's role and Main character-triggered emotions. We uncovered almost a similar number (n = 24) of expressions that reflected alternative responses to the game diverging from character identification (Table 4).

Table 3
Identification with the Main Character

Main and sub-categories	f
Adoption of main character's role	
Adopting character's goals	8
Perspective taking	5
Main character-triggered emotions	
Feeling with character	9
Feeling empathy	5
Total	27

These were grouped into two main categories: Self-oriented playing and Detachment. Furthermore, 15 expressions were interpreted as supporting identification with the game's main character, while slightly more expressions (n = 24) were interpreted as hindering identification (Table 5). Supporting factors were grouped into two main categories: Similarity of main character and Control over main character. Further, hindering factors were grouped into two categories: Mismatch with main character and Negative perceptions of game.

Table 4
Responses Diverging from the Main Game Character Identification

Main and sub-categories	f
Self-oriented playing	
Playing through own perspective	7
Relating game events to self	8
Detachment	
Feeling about main character	6
Spectatorship	3
Total	24

Table 5
Factors Supporting (+) and Hindering (-) Identification

Main and sub-categories	f
Similarity of main character (+)	
Psychological similarity	4
Demographic similarity	2
Control over main character (+)	
Making decisions for character	5
Taking care of character	4
Total	15
Mismatch with main character (-)	
Differences with character	9
Character is unacceptable	5
Character is unlikeable	3
Negative perceptions of game (-)	
Negative perceptions of game concept or events	5
Non-player characters are unlikable	2
Total	24

5.1. Ways to identify with the game's main character

The analysis revealed all three components of identification: cognitive, motivational, and emotional. Adopting the character's role reflected a motivational component when students described stepping into the character's role by adopting his goals. By adopting the character's goals, students were often drawn into seeing and experiencing events from the character's perspective. Consequently, the cognitive component was manifested when students experienced the game events through the character's perspective. In Example 1, a student describes how they took a character's perspective instead of judging him.

Example 1: *I really got into the main character's shoes. I was on his side, not like, "ugh, why are you doing that?"* (Perspective taking, Student 7)

The emotional component was apparent when students adopted the character's emotions or experienced empathic concern. For example, in some expressions, students reflected how they shared the emotional states with the character, as exemplified in Example 2.

Example 2: *If Eddie occasionally blurts something out or says something like that, I also felt a bit embarrassed myself, like, "oh no." I could really relate to him in that way, and it definitely induced those kinds of feelings in me.* (Feeling with the character, Student 11)

Feeling with the character implies that the player feels the same emotions as the game character. For example, if the game character is happy after completing a difficult task, the player also tends to feel happiness. Feeling empathy for a character differs from "feeling with the character" in that empathy involves recognizing and understanding the character's emotions without necessarily experiencing the same feelings. For instance, a player may empathize with a character's frustration during a difficult task, recognizing and feeling compassion for the character's struggle but not necessarily feeling frustrated themselves. In Example 3, a student describes how they empathized with the game character.

Example 3: *I mostly felt this deep empathy, this sense of sadness and distress, when Eddie's phone fell and broke while he was at work. I was just like, "Oh no, no way, oh no! That's just terrible."* (Feeling empathy, Student 11)

5.2. Responses diverging from character identification

In addition to identification with the game's main character, we also identified expressions that diverged from character identification. The expressions reflected either self-oriented playing or detachment. Instead of taking the main character's perspective or adopting his goals, self-oriented playing was characterized by playing through one's own perspective (e.g., "I tried to approach it as if it was me. Like what I would choose in those situations and not necessarily the best choices for him [Eddie]"; Student 1). Some of the students who adopted self-oriented playing approach raised the issue that the limited number of options distracted their playing.

Some students mentioned that they related the game's events to similar experiences from their own lives and considered their own life during playing (Example 4). In these cases, students were not totally immersed in the main character's life but imagined their own possible feelings in the situations or used the game as a tool for self-reflection.

Some expressions indicated detachment from the game's main character. For example, in contrast to expressing the same emotions that the character is feeling, students expressed feelings, such as shame or embarrassment, about the main character's behavior (Example 5).

Example 4: *It was really a relatable life situation...the beginning of the studies...it also gave a kind of lens to look at, what I prioritize in my life and whether those priorities are the right ones.* (Relating game events to self, Student 4)

Example 5: *It [Eddie's behavior] annoyed me so badly because I would not behave like that, even though I have difficult sometimes. Somehow, I always have manners or something like that. So, I became ashamed or felt really uncomfortable.* (Feeling about main character, Student 9)

5.3. Factors supporting or hindering character identification

We identified several factors that may have supported or hindered identification with the game's main character. Experiencing the similarity (i.e., psychological or demographic similarity) with the game's main character and control over the main character were two identified supporting factors. In Example 6, the student describes how they experienced similarity with the main character.

Example 6: *The nurse told* [Eddie], *"Well, obviously a lot has changed, so of course it has an effect." Since I only started university last fall, it was still fresh in my mind, remembering how it felt to suddenly be in a completely new environment.* (Demographic similarity, Student 12)

The control over the main character was apparent when students took care of the character. For example, in some expressions, students reflected on how they shared the responsibility of taking care of the character, as illustrated in Example 7.

Example 7: *As Eddie, I had to choose between playing or going to sleep, and I thought, "Well, I would probably play myself, but it would be better to go to sleep."* (Taking care of the character, Student 4)

The hindering factors, in turn, were identified as a mismatch with the character (i.e., differences between the self and the main character or the character being perceived as unacceptable or unlikeable), as well as negative perceptions of the game concept or events, or a lack of acceptance or likability toward non-player characters.

A mismatch with the game character was experienced, for example, when students expressed feelings such as embarrassment and awkwardness about the main character's behavior, identifying a lack of acceptability and likability in the character (Example 8; see also Example 5) or they felt a disconnection between oneself and the main character (Example 9).

Example 8: *Both the main character and the other characters sometimes reacted in ways that I... I wouldn't believe anyone would normally react, and that made it harder to immerse myself.* (Character is not acceptable, Student 2)

Example 9: *I'm generally a person who easily identifies with others, but it requires seeing something familiar in the character for that connection to happen naturally, in a way. I think, in this case, Eddie differs in age, life situation, and gender, so while putting myself in his position was relatively easy, fully identifying with him as a character was not a particularly strong experience in this case.* (Differences with the main character, Student 10)

Some students reported that their identification with the character would have been deeper if they had been able to customize the character or its surroundings. These expressions were identified as negative perceptions of the game (see Example 10).

Example 10: *Maybe if I had been able to choose the t-shirt or create a bit of the character, in that case, there would have been a moment, like "Yes! Now I have owned this"* (Negative perception of the game concept or events, Student 8)

5.4. Experiences of the Full ADHD game by students

Table 6 summarizes how individual students experienced the game. Some students identified more strongly with the main character than others. Slightly more than half of the students reported at least one sub-category of identification. The intensity of identification varied during the playing experience. Thus, also those students who identified with the main character occasionally engaged in self-oriented playing or experienced detachment (e.g., Students 6 and 12). Aligning with these observations, some students reported both factors that may support or hinder identification (e.g., Students 4, 7, and 12). The variation in character identification may be attributed to the fact that the game includes a diverse range of events, which likely evoke different responses from students at various points during the gameplay.

6. Discussion

The present study explored game character identification within the Full ADHD health literacy game. The game is not designed to induce specific emotions or empathy but aims to increase understanding of ADHD by providing insights into the lived experiences of individuals with ADHD, including the challenges of managing executive function resources. Students recruited from special education courses shared their playing experiences through semi-structured

interviews. Using the character identification framework, we analyzed how students identified with the game's main character, who was recently diagnosed with ADHD. Additionally, we explored the factors associated with game character identification. By exploring these aspects, this study provides unique contributions to understanding how students experience a narrative-driven game, including a neurodivergent game character.

Our findings align with previous views on identification with media (game) characters, demonstrating that features of characters, texts, and audiences may contribute to the level of identification [5]. Consequently, consistent with Cohen's [20] theoretical propositions, some students identified more strongly with the game's main character than others. Furthermore, the intensity of identification varied throughout the playing experience depending on the situations that players faced in the game.

Table 6
Experiences of the Full ADHD Game by Student (S)

Category	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
A1. Adoption of character's role		x		x		x	x	x			x	x
A2. Main character-triggered emotions		x				x	x				x	x
B1. Self-oriented playing	x	x		x	x	x		x	x			x
B2. Detachment				x	x	x	x		x			x
C1. Similarity of character			x			x	x			x		x
C2. Control over character				x								x
D1. Mismatch with character		x			x		x	x	x	x	x	x
D2. Negative perceptions of game		x		x	x				x			

Note. A = Identification with main character; B = Responses diverging from character identification; C = Factors supporting identification; D = Factors hindering identification

Our findings reveal that students exhibited different ways of playing depending on the level of character identification. Identification was expressed through a willingness to step into the character's shoes by adopting the character's goals, perspectives, and emotions. Occasionally, students also demonstrated empathy toward the main character. This suggests that students immersed themselves in the game world, forming a deep cognitive, emotional, and motivational connection with the game's main character and the narrative. According to Cohen [20], such identification can enhance comprehension of stories and can contribute to changes in self-perception and attitudes. Therefore, the Full ADHD game may have potential to help players to understand how ADHD can influence on daily life.

In contrast to identification, some students exhibited detachment from the main character or engaged in a self-oriented playing approach. In doing so, students considered game events from

their own perspective and related game events to their personal experiences. Furthermore, students evaluated the game character's behavior based on their own values. This often resulted in emotions about the character that differed from the emotions depicted within the story, positioning students more as spectators than as active participants immersed in the game world.

Interestingly, the ways of experiencing the game were not static, but we observed variation between states of identification, self-oriented playing, and detachment (see Table 6), depending on the specific game events and characteristics of the game world Our findings suggest that the features of the game and characteristics of the students contributed to these dynamic shifts in identification and engagement. Aligned with the similarity–identification hypothesis [22], we observed that some students perceived demographic and psychological similarity, which is an important factor supporting identification. Despite of high frequency of mismatch between students and the game's main character, students could identify with the game's main character, suggesting that vivid descriptions of the character's mental states, exaggerated emotional gestures, and physical surroundings may help players to immerse in the game and enhance identification [20].

Furthermore, in line with the similarity–identification hypothesis [22], some students mentioned that the personalization of characters could have supported identification. In fact, Turkay and Kinzer [24] found that character customization features supported identification with the game characters. Therefore, future research could examine how personalized narratives and characters could address the detachment issues, potentially enhancing players' identification with game characters and perspective-taking in health literacy games.

6.1. Limitations

One of the limitations of this study is that most of the participating students reported having some personal experiences with ADHD, which may have been reflected in their experiences. Future studies should also seek to investigate educational students with limited experiences with ADHD.

A limitation related to character design is that the game's main character is male, which may have influenced students' experiences of identification and the extent to which they engaged with the lived experiences depicted. Unfortunately, due to ethical reasons we could not include students' demographic information in the analyses to clarify this issue. Future research could explore how varying the gender or other characteristics of the main character might impact identification.

Another limitation is that we relied on students' experiences only retrospectively. The retrospective interviews probably did not capture all the nuances of the identification processes students may have experienced when playing the game. Thus, we call for further research employing methods that better capture game character identification's dynamic and context-dependent nature. For example, think-emote-aloud protocols [32], where the players verbally express their thoughts and emotions during the gameplay, could provide a more comprehensive understanding of identification processes and mechanisms.

Finally, we acknowledge that our positionality as game-based learning and literacy researchers may limit our interpretations of students' experiences of neurodiversity. Additionally, it is important to note that none of us has ADHD.

6.2. Limitations

Disability simulators and empathy games have faced widespread criticism for their potentially reinforcing negative stereotypes and perpetuate stigma [33, 34]. It is argued, for example, that players cannot assume the identity of a disabled minority with all the characteristics, nuances of different contexts, and consequences of actions because they can stop playing the game anytime they want. Furthermore, scholars have emphasized that mental health representations in games are often too narrow and do not fully utilize the affordances that games could provide [35]. Although ADHD is successfully represented through several dimensions in the Full ADHD game (characters, narrative, mechanics, social relationships, environments) and the game was designed by experts

together with people with ADHD, we acknowledge that its portrayal may still fall short of fully capturing the diverse and multifaceted experiences of individuals with ADHD. Future work should continue to critically examine and expand the representation of ADHD in games to ensure inclusivity, authenticity, and a deeper understanding of the lived experiences of neurodivergent individuals.

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